



Dart Aerospace Ltd.
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K6A 1K7
Canada

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D412-664-203
Job Sheet 186557



008075

Part No: D412-664-203

Job Qty: 1 ea

Part Name: Aft Crosstube - High



Part Weight: 0 lbs

Status: New

Priority: Medium

Job Created: 11/16/18

Job Tracking No:

Due Date: 12/21/18

Created By: Jesse White

Type: Stock

Description: SIOP

Note: D412-664-243 REV F/ IIN-D212-664 REV.J IPP Rev:E 04.02.16 Reformat; Added D3189-1 K/DS IPP Rev:F 06-03-29 Remove Comments on Pick List JLM IPP Rev:G 06.12.08 per ECN 886 EC IPP Rev:H 07-04-30 As per Rev D JLM IPP Rev:I 08-06-12 add comment in seq. 21 DD verified by:EC IPP rev J 11.04.21 DEO D412-664-243-E-1 EC verified DD IPP REV:K 11.10.03 DEO D412-664-243-E-2 DD verf:EC

Ship Via:

Bill of Materials



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CANADA
TEL.: 1 613 632-5200
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www.dartaerospace.com

Container No: S141220



Part: D412-664-203

Job No: 186557

Serial No/Batch: S141220

Revision: F/J

Inspector:

Exp Date:

Instructions: TC STC SH01-9 Issue 3, FAA STC SR01298NY 09/01/08, EASA ST

e.jesse

DQA: _____ Date: _____

WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION		AGAINST DEPARTMENT/PROCESS							
	Rework	☐	Skid-tube	☐	Cross tube	☐	Water Jet	☐	Engineering	☐
	Scrap	☐	Machining	☐	Small Fab	☐	Prod. Eng. Coord.	☐	Quality	☐
	Use-as-is	☐	Thermoforming	☐	Finishing	☐	Rec/Store/Packaging	☐	Other	☐
	Suspected Unapproved	☐	Large Fab	☐	Composite	☐	Supplier	☐		

Date :	Step #:	QTY Effective :	MRB (QSI042) Approval
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Description Work Order Deviation	Disposition	Completed By
		Lead hand / Supervisor Approval Verification
		QC / QA Coordinator Approval

Root Cause			FAULT CATEGORY		
Environment	☐	No Re-verification	Pressure/Forced	☐	Temperature/Cure
Design	☐	Operator	Bending	☐	Set-up
Doc/Data	☐	Offset/Setup	Centre Not Concentric	☐	BOM/Route
Equip/Tooling	☐	Supplier	Cracks	☐	Broken/Damage/Defect
Handling/Pre	☐	Training	Crimp/Kink/Ripple/Wave	☐	Inspection Incomplete/Unqualified
Material	☐	Use for Testing	Cuffs	☐	Contamination
Internal Transport	☐	Poor Information	Crushing	☐	Countersink
Tribal Knowledge	☐	Rushing	Heat Treat	☐	Cut Too Short
LOA	☐	Product Improvement	Wave/Twist in Tube	☐	Instructions Incomplete/Unclear
Substation	☐	Process Improvement	Marks/Chatter	☐	Drill Holes
Past Expiry Date	☐	Manufacturing Process			
Misidentified	☐	Past Due	OTHER :		

Job Routing									
Op No	Operation	Qty	Start Date	Due Date	Standard		Workcenter/Supplier		Sign-off
					Setup Hrs	Run Hrs	Workcenter / Supplier	Lead Time	
90	Start up Operation	1 Ea		12/21/18	0.00	0.00	Start Up Stores/Pkg-1		DPZ 1-2-19
110	Packaging	1 pcs		12/21/18	0.00	0.00	Packaging1-4		DPZ 1-2-19
120	CNC Bend Crosstubes	1 pcs		12/21/18	0.00	5.26	CNC Bend Crosstube		56 DAS 38
130	QC	1 pcs		12/21/18	0.00	0.00	QC15		DPZ 1-2-19
140	Crosstubes	1 pcs		12/21/18	0.00	3.33	Crosstubes-2		DPZ 1-2-19
160	HandFXtube	1 pcs		12/21/18	0.00	1.03	HandFinish5		DPZ 1-2-19
165	QC	1 pcs		12/21/18	0.00	0.00	QC7-3		38 DAS
170	QC	1 pcs		12/21/18	0.00	0.00	QC5		9-89 38
180	Outsource	1 pcs		12/21/18			SKY002-VC	5	9-19-01-16
190	Packaging	1 pcs		12/21/18	0.00	0.00	Packaging2		JAN 7 2019
200	QC	1 pcs		12/21/18	0.00	0.00	QC5		38
210	SprayPaint	1 pcs		12/21/18	0.00	1.47	Spray Paint		AS 19-1-19
220	QC	1 pcs		12/21/18	0.00	0.00	QC14		PD 19-02-11
230	Crosstubes	1 pcs		12/21/18	0.00	3.33	Crosstubes-2		PD 19-1-31
240	QC	1 pcs		12/21/18	0.00	0.00	QC5		PD 19-02-11
250	Packaging	1 pcs		12/21/18	0.00	0.00	Packaging1-4		DA FEB 12 2019
260	QC	1 pcs		12/21/18	0.00	0.00	QC4		69 DAS
270	Packaging	1 pcs		12/21/18	0.00	0.00	Packaging3-2		21 9-89 69
275	DC	1 pcs		12/21/18	0.00	0.00	DC		FEB 13 2019
280	QC21-FG	1 Ea		12/21/18	0.00	0.00	QC21		21 FEB 13 2019

Part Op 120 - Bend tube as per Dwg D412-664-243 using CNC bender program 412-aft and Folio FT010

Descriptions: 140 - 1-Drill pilot holes in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551 and drill table DT8577 using #9 holes as per QSI 10 to install towers. 2-Ream hole to finish size in tube as per Dwg D412-664-243 using drill Jig DT8550 & DT8551. Check dimensions between holes, both sides on both cuffs, to ensure alignment with saddle holes. 3-SCRIBE PART # & BATCH # ACCORDING TO NOTE 6 4- *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-243

160 - ***IMMEDIATELY AFTER GRINDING***

170 - INSPECT ENGRAVING AND BATCH #

180 - *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

190 - *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***

200 - *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** Inspect for damage & ensure results are as per Dwg D412-664-203

210 - *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE*** **VERIFY BY _____ BATCH # TO MATCH W/O _____

PRIMER: 5143304 START TIME: _____ 2-Paint outside crosstube with White Imron as per DWG D412-664-243 and QSI 005 4.2 3- Apply clear coat after paint as per DWG clear 138875 Paint 5140325

220 - Then, Wrap in plastic bag to protect from scratches

230 - Assemble as per Dwg D412-664-203 1- Install center support using scotch-weld DP460 per QSI 015, as per DWG. note 13. Install supports clamps using as per Dwg D412-644-243. Install clamp with rubber cushion as per DWG. note 14.

ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT Torque clamps on support to 80-100 IN-LBS AS PER DWG. EXP DATE: _____ 2- **IF NOT ALREADY PRESENT ON CHAFFING SHIELD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG. EXP DATE: _____

AFTER FINISH CURE TIME 24H START CURE TIME: 19-1-31 FINISH CURE TIME: 19-2-01

240 - ***RE-CHECK TORQUE ON CLAMP AFTER PROSEAL HAS CURED FOR 24HOURS AS PER DWG.***

270 - Identify and pack for shipping as per PPP D412-664-203 *****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date ***** Time & date of packaging: _____

Location: _____

275 - Photocopy bluefile and create labels as per PPP D412-664-203 CHG 010

280 - 1- *****LAY DOWN CORSTUBE ON TABLE AND PUT DT10302 PINS IN SADDLE HOLE FACING UP TO LOCATE CENTER OF CROSSTUBE***** Install center support using scotch-weld DP460 per QSI 015, as per DWG. note 13. Install supports clamps using as per Dwg D412-644-243. Install clamp with rubber cushion as per DWG. note 14. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG. 1- *****LAY DOWN CORSTUBE ON TABLE AND PUT DT10302 PINS IN SADDLE HOLE FACING UP, USE HOLE IN TAPE MESURE TO PUT IN PINS FOR LOCATING CENTER OF CROSSTUBE. ***** Install center support using scotch-weld DP460 per QSI 015, as per DWG. note 13. Install supports clamps using as per Dwg D412-644-243. Install clamp with rubber cushion as per DWG. note 14. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG.

Batch Pro Seal
138876
exp 19-6
scotch weld
138855 19-4

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : _____					

Job BOM

Part / Item	Component Name	Quantity	Operation	Container
D412-664-203TRN	Crosstube Turning Detail	1 Ea (1 ea)	90-Start up Operation	5083093
D2896-1	Support	1 Ea (1 ea)	230-Crosstubes	
D3189-1	Chaffing Shield	2 Ea (2 ea)	230-Crosstubes	
D3595-063-570	Rubber Cushion 0.63" Wide X 5.70" Long	2 Ea (2 ea)	230-Crosstubes	
MS21920-28	Clamp	4 Ea (4 ea)	230-Crosstubes	
MS21920-30	Clamp	2 Ea (2 ea)	230-Crosstubes	
AN6-40A	3/8-24 Bolt X 3" Long	4 Ea (4 ea)	250-Packaging	5107752
AN6-41A	Bolt	2 Ea (2 ea)	250-Packaging	5123684
MS21042L6	Nut	6 Ea (6 ea)	250-Packaging	5107756
NAS1149D0663J	Washer	18 Ea (18 ea)	250-Packaging	5093765

Job Allocations

Operation	Component Part	Required	Inventory	Allocated
90-Start up Operation	D412-664-203TRN	1	4	0
230-Crosstubes	D2896-1	① 5053883	11	0
	D3189-1	② 5123534	23	0
	D3595-063-570	③ 5062608	112	0
	MS21920-28	④ 5103946	74	0
	MS21920-30	2 5005127	29	0
250-Packaging	AN6-40A	4	98	0
	AN6-41A	2	45	0
	MS21042L6	6	266	0
	NAS1149D0663J	18	858	0

Part Specifications

Specifications could not be found.

Plex 11/16/18 3:45 PM dart.white.jesse

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

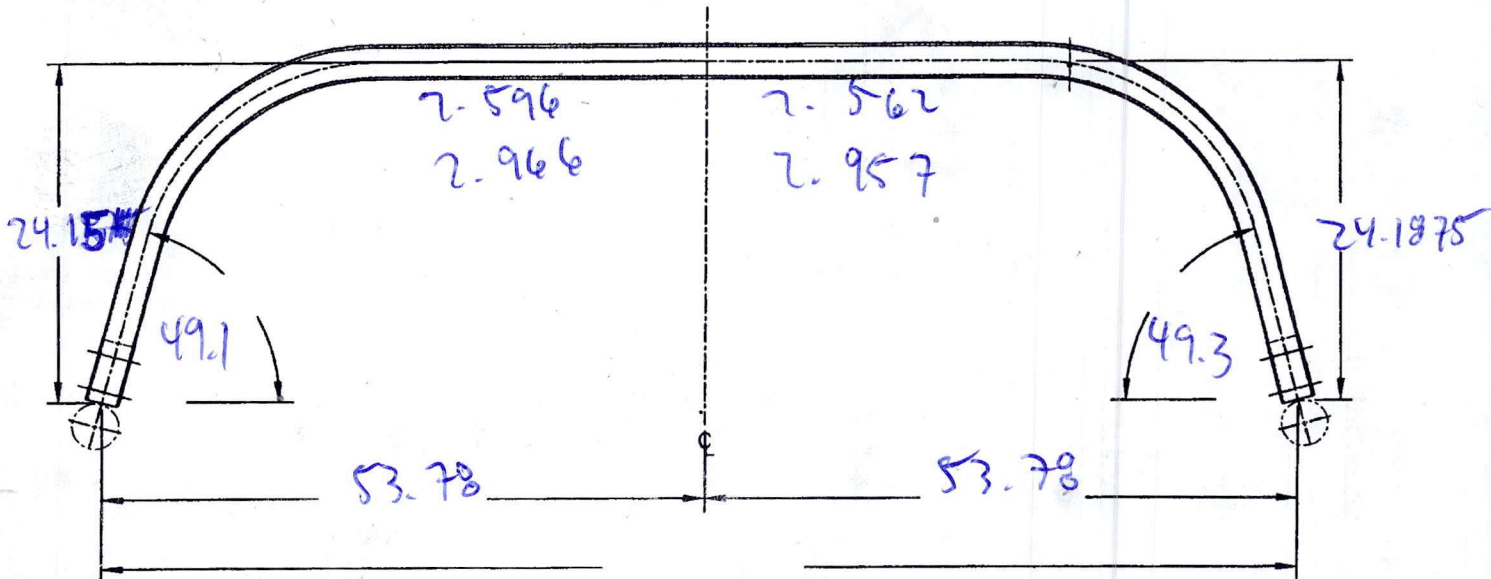
QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐					
Date :		Step #:		QTY Effective :			MRB (QSI042) Approval		
Description Work Order Deviation				Disposition				Completed By	
								Lead hand / Supervisor Approval Verification	
								QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY							
Environment ☐	No Re-verification ☐	Pressure/Forced ☐	Temperature/Cure ☐	Power Loss/Surge ☐	Positioned Wrong ☐				
Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐				
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐				
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐				
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐				
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐				
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐				
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐				
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐				
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐				
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____							
Misidentified ☐	Past Due ☐								

DART AEROSPACE LTD	Work Order:	
Description: Crosstube High Aft (412)	Part Number:	D412-664-203
Inspection Dwg: D412-664-243 Rev: F		Page 1 of 1

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.59	53.85
Angle	49	52
Total Span	107.18	107.70
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	9	8
Crushing	6.6%	7.1%
Comments		
Acceptable per DR-1059 Rev. A 4/14/17		

QC15 Inspection	DAS 38
Date	19-09-07

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	07.05.08	Dimensions updated per Dwg rev. D	KJ/JLM	
C	10.02.02	Dwg Rev updated	KJ	
D	12.04.16	Added bending, crushing dimensions	KJ	
E	14.09.08	Max crushing % revised	KJ	

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition			
				Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER : ☐					

Item	Qty -243	Part Number	Description
1	X	D412-664-243	CROSSTUBE ASSEMBLY (412 HIGH AFT)
2	1	D6009-129	CROSSTUBE
3	2	D3595-063-570	RUBBER CUSHION
4	1	D2896-1	SUPPORT
5	2	D3189-1	CHAFING SHIELD
7	4	MS21920-28	CLAMP
8	2	MS21920-30	CLAMP (OR MS21920-32)
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890 B-2	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 124.100±0.020 (BEFORE BENDING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART P/N "D412-664-243" AND B/N ON INSIDE OF CUFF PER QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 47.0 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. DO NOT GRIND TUBE AFTER SHOT PEEN.

TURNING

- 10) WHEN TRANSITIONING TO STOCK MAT'L, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY. TRANSITION SHOULD BE SMOOTH.

BENDING

- 11) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R30 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 12) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

- 13) INSTALL D2896-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 14) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE THE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP SIDE OF CROSSTUBE.
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3189-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEAL D3189-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 16) TORQUE CLAMPS ON D2896-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D3189-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

RELEASED
2014-05-26

F	NOTES RE-ORDERED, SCOTCH-WELD WAS MAGNOBOND (C8-1), ADD CLAMP RETORQUE (A8-1), REMOVE ABRASION STRIP, ADD INSPECTION WINDOW (C8-1), CHAFING SHIELD NOW 4.38 WIDE (C8-2), ADD 7% CRUSHING (B8-1), CHG BEND HEIGHT TOL. TO ±0.25 (C1-3), CHG CUFF TOL. (D2-4), CLAMPS FLIPPED TO PREVENT CHAFING (B7-2, B7-3), INCORP. DEO E-2/4	CP	14.04.01
E	REFORMAT/REVISE GENERAL NOTES; REORGANIZED VIEWS AND REFORMATTED DRAWING TO CURRENT STANDARDS; RELOCATED FLAG #6 PER PAR 08-048 (ZN A6-3); ADD TOLERANCE (ZN B6-3, C4-3, C8-3 & C5-3); MOVED TURNING DETAIL & UPDATED TOLERANCE TO SHEET 4.	RF	09.09.30
D	REMOVE D2732-058, CHANGE TO D3595-063-570	PH	07.03.09
C	REMOVE D2856-600-1087, ADD D2732-058 & MAGNOBOND 6398, MS21920-32 WAS MS21920-30	MB	06.10.27
B	ADD HOLES FOR COMPATABILITY WITH BHT/AA SKIDTUBES	PH	05.02.04
A	NEW ISSUE	PH	01.10.17
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D412-664-243	REV. F SHEET 1 OF 4
TITLE CROSSTUBE ASSEMBLY (412 HI AFT)	SCALE NTS
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DQA: _____ Date: _____

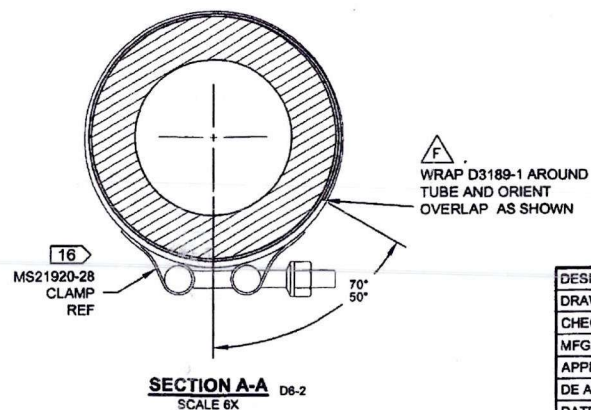
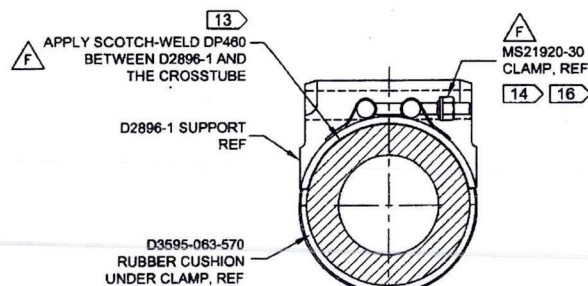
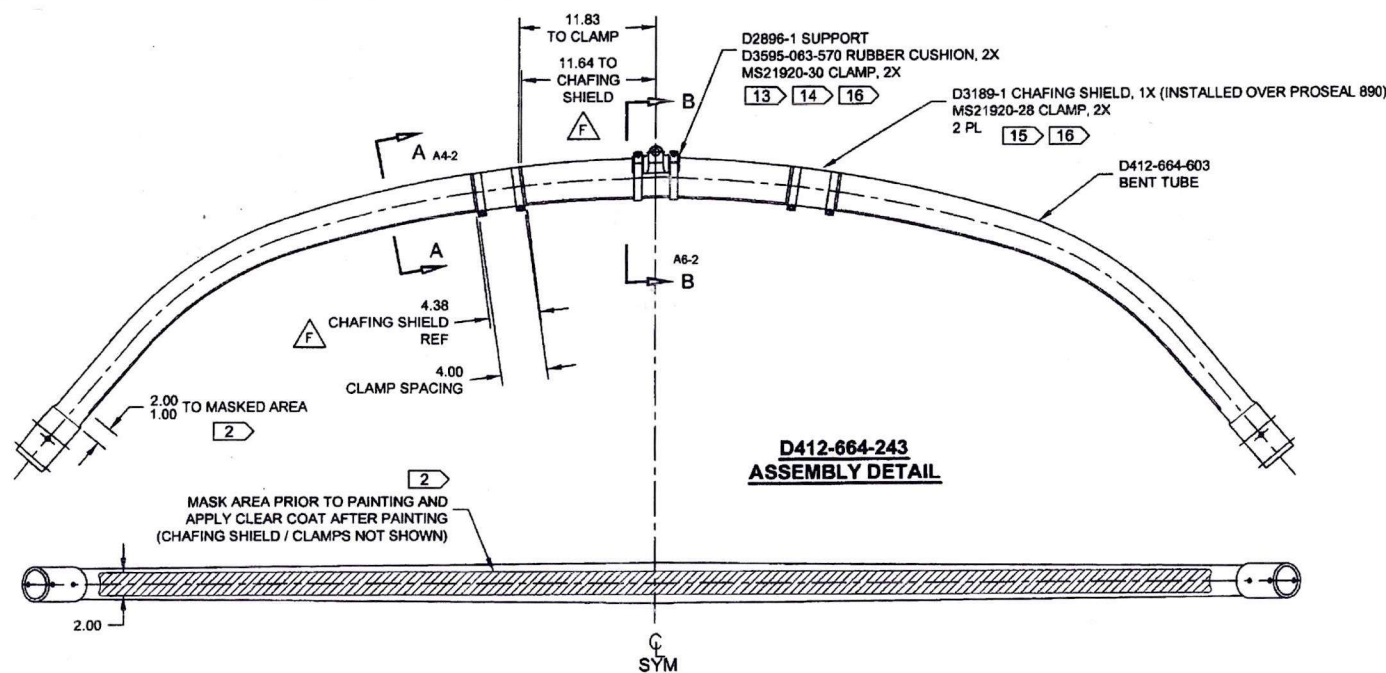


WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation			Disposition		
			Completed By		
			Lead hand / Supervisor Approval Verification		
			QC / QA Coordinator Approval		
Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐	No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐	Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐	Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐
OTHER :					



RELEASED
2014-05-26

DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO. D412-664-243	REV. F SHEET 2 OF 4
MFG. APPR.		TITLE	SCALE
APPROVED		CROSSTUBE ASSEMBLY (412 HI AFT) NTS	
DE APPR.		COPYRIGHT © 2001 BY DART AEROSPACE LTD	
DATE	14.04.01	THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date :	Step #:	QTY Effective :		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition			
				Completed By	
				Lead hand / Supervisor Approval Verification	
				QC / QA Coordinator Approval	
Root Cause		FAULT CATEGORY			
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Design ☐	Operator ☐	Bending ☐	Set-up ☐	Folio/Program ☐	Outside Dimensions ☐
Doc/Data ☐	Offset/Setup ☐	Centre Not Concentric ☐	BOM/Route ☐	Grain ☐	Over/Under tolerance ☐
Equip/Tooling ☐	Supplier ☐	Cracks ☐	Broken/Damage/Defect ☐	Weld ☐	Part Incorrect ☐
Handling/Pre ☐	Training ☐	Crimp/Kink/Ripple/Wave ☐	Inspection Incomplete/Unqualified ☐	Wrong Stock Pulled ☐	Part Lost/Missing ☐
Material ☐	Use for Testing ☐	Cuffs ☐	Contamination ☐	Out of Sequence ☐	Part Moved ☐
Internal Transport ☐	Poor Information ☐	Crushing ☐	Countersink ☐	Off-set ☐	Drawing ☐
Tribal Knowledge ☐	Rushing ☐	Heat Treat ☐	Cut Too Short ☐	Mislabeled ☐	Finish ☐
LOA ☐	Product Improvement ☐	Wave/Twist in Tube ☐	Instructions Incomplete/Unclear ☐	Fit/Function ☐	Misread ☐
Substation ☐	Process Improvement ☐	Marks/Chatter ☐	Drill Holes ☐	Misaligned/off center ☐	Turning Sequence ☐
Past Expiry Date ☐	Manufacturing Process ☐	OTHER : _____			
Misidentified ☐	Past Due ☐				

DQA: _____ Date: _____

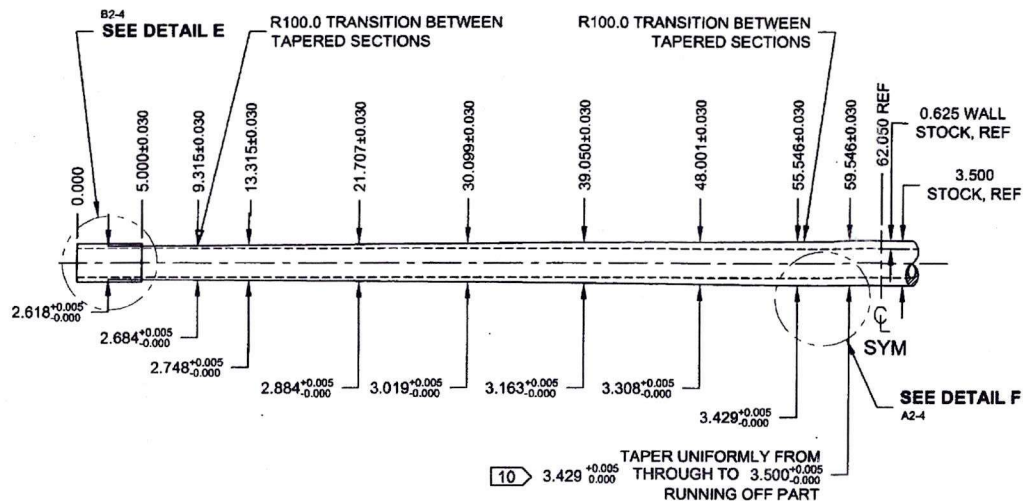


WORK ORDER NON-CONFORMANCE / UPDATE

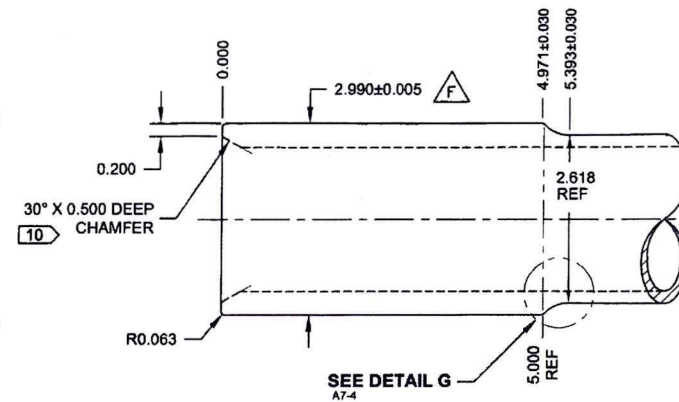
QA Closed: _____ Date: _____

Work Order update only ☐

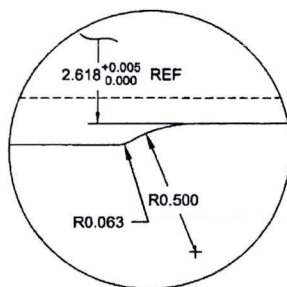
Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Cross tube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐			
Date : _____	Step #: _____	QTY Effective : _____		MRB (QSI042) Approval	
Description Work Order Deviation		Disposition		Completed By	
				Lead hand / Supervisor Approval Verification	
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Root Cause		FAULT CATEGORY			
Environment ☐ Design ☐ Doc/Data ☐ Equip/Tooling ☐ Handling/Pre ☐ Material ☐ Internal Transport ☐ Tribal Knowledge ☐ LOA ☐ Substation ☐ Past Expiry Date ☐ Misidentified ☐ No Re-verification ☐ Operator ☐ Offset/Setup ☐ Supplier ☐ Training ☐ Use for Testing ☐ Poor Information ☐ Rushing ☐ Product Improvement ☐ Process Improvement ☐ Manufacturing Process ☐ Past Due ☐	Pressure/Forced ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Wave/Twist in Tube ☐ Marks/Chatter ☐ Temperature/Cure ☐ Set-up ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Inspection Incomplete/Unqualified ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Instructions Incomplete/Unclear ☐ Drill Holes ☐	Power Loss/Surge ☐ Folio/Program ☐ Grain ☐ Weld ☐ Wrong Stock Pulled ☐ Out of Sequence ☐ Off-set ☐ Misabeled ☐ Fit/Function ☐ Misaligned/off center ☐ Positioned Wrong ☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Drawing ☐ Finish ☐ Misread ☐ Turning Sequence ☐			
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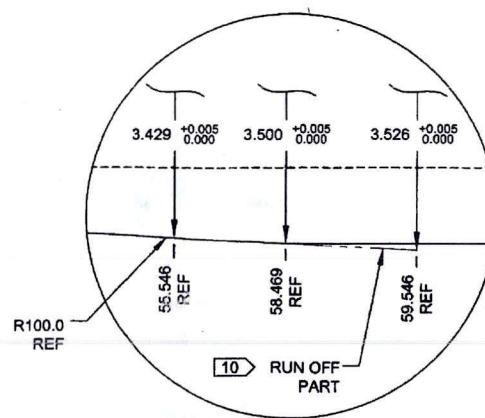
D412-664-243TRN
TURNING DETAIL



DETAIL E:
CROSSTUBE CUFF
SCALE 5X D8-4



DETAIL G:
CUFF TRANSITION
SCALE 10X C2-4



DETAIL F:
TAPER RUN-OFF
NOT TO SCALE C4-4

RELEASED
2014-05-26

DESIGN		DART AEROSPACE LTD
DRAWN		HAWKESBURY, ONTARIO, CANADA
CHECKED		DRAWING NO. REV. F
MFG. APPR.		D412-664-243 SHEET 4 OF 4
APPROVED		TITLE SCALE
DE APPR.		CROSSTUBE ASSEMBLY (412 HI AFT) NTS
DATE	14.04.01	COPYRIGHT © 2001 BY DART AEROSPACE LTD

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DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____		DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐		AGAINST DEPARTMENT/PROCESS <table style="width: 100%; border: none;"> <tr> <td style="width: 15%;">Skid-tube ☐</td> <td style="width: 15%;">Cross tube ☐</td> <td style="width: 15%;">Water Jet ☐</td> <td style="width: 15%;">Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>						Skid-tube ☐	Cross tube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐																																															
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OTHER : ☐																																																																							



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER PO042284



Supplier: SKY002-VC
Skyservice
6120 Midfield Road
Mississauga
ON
L5P 1B1 Canada
Phone: 905-678-5636
Fax: 905-678-5841

PO No: PO042284
PO Date: 1/15/19
Due Date: 1/23/19
**Purchase Order
Revision:**
Revision Date:
Ship-To Contact: Phone:

Ship To: 1270 Aberdeen Street
Hawkesbury
ON
K6A 1K7 Canada
Phone: 613-632-5200

Via: Ground
Pymt Terms: Net 30
Freight Terms:
Special Comments:

Items

Line Item	Job	Part	Description	Status	Account	Due Date	Order Quantity	Received Quantity	Balance	Unit Price (CAD)	Extended Price
1	186556	D412- 664-203	Aft Crosstube - High : TC STC SH01-9 Issue 3, FAA STC SR01298NY 09/01/08, EASA STC EASA.IM.R.S.01304 07/03/06, DGAC MEXICO STC IA- 316/2015 15/06/17 *** WEAR LATEX GLOVES WHEN HANDLING CROSSTUBE***	Firmed	-	1/23/19	1 pcs	0 pcs	1 pcs	\$208.75/pcs	\$208.75
	186557		1 X JAN 17 2019	Firmed	-	1/23/19	1 pcs	0 pcs	1 pcs	\$208.75/pcs	\$208.75
	186559		1 X JAN 17 2019	Firmed	-	1/23/19	1 pcs	0 pcs	1 pcs	\$208.75/pcs	\$208.75
	186560		1 X JAN 17 2019	Firmed	-	1/23/19	1 pcs	0 pcs	1 pcs	\$208.75/pcs	\$208.75
Sub Total:							4	0	4		\$835.00

Grand Total: \$835.00

DAS
38
9-89



Dart Aerospace Ltd.
1270 Aberdeen St
Hawkesbury, ON
K6A 1K7
Canada

Tel (613) 632-5200

PURCHASE ORDER

PO042284



Order Notes

Procurement Quality Clauses
A005 right of entry
A012 chemical and physical test report
A016 personnel qualification
A017 raw material identification (as applicable)

A022 Apical Processing
A024 process certifications
A026 certification of material conformance

A041 quality management system
A042 dart notification by supplier
A043 retention of quality documents

A048 counterfeit parts avoidance, detection, mitigation and disposition program

A049 supplier awareness

Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Plex 1/16/19 3:38 PM dart.tsimiklis.chrisoula

**skyservice****Work Order Traveler**

Sky Service F.B.O. Inc.

10105 Ryan Avenue, Dorval, Quebec, H9P 1A2

TCCA AMO 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO38921	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: PO042284 ✓
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT (LIQUID PENETRANT CRACK TEST) ON THE FOLLOWING FOUR CROSSTUBES: ✓

P/N: D412-664-203 AFT CROSSTUBE-HIGH ✓

1- JOB SHEET# 186556 ✓ 2- JOB SHEET# 186557 ✓
3- JOB SHEET# 186559 ✓ 4- JOB SHEET# 186560 ✓

Action Taken:						Date:	Initial/Stamp:
LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-4) AS PER ASTM1417M-16						16 Jan 2019	
-NO CRACK FOUND.							
PEN.(ZL-56, MPO13600), DEV.(SKD-S2, MPO11715), CLEANER(SKC-S, MPO MPO19368)							
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

DAS
38
9-89

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: 	ACA/SCA Stamp: 	Date: 16 Jan 2019
Name: CHRISTIAN BRIEN		